

Dilations, Scale Factor and Similar Figures

Grade 10 – Geometry math · Test Answer Key · Standards: G-SRT.A.1, G-SRT.A.2, G-SRT.A.3

Each solution shows the rule or ratio used and the points earned. In the coordinate problems, the vector from the center is shown before scaling.

Standards: G-SRT.A.1, G-SRT.A.2, G-SRT.A.3 · **Level:** Grade 10 Geometry

Question 1 Dilate two points (2 points)

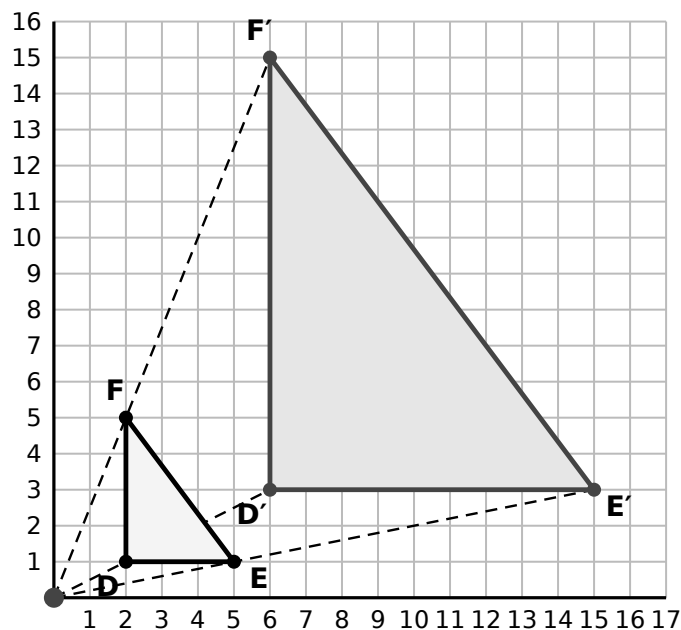
- a. $(2.5 \cdot (-3), 2.5 \cdot 4) = (-7.5, 10)$.
 b. $(6 \div 3, -9 \div 3) = (2, -3)$.

(a) $(-7.5, 10)$, (b) $(2, -3)$

Scoring: 1 point per image.

Question 2 Dilate a triangle (3 points)

Multiply each coordinate by 3: $D'(6, 3)$, $E'(15, 3)$, $F'(6, 15)$.



Solved figure for Question 2.

$D'(6, 3)$, $E'(15, 3)$, $F'(6, 15)$

Scoring: 1 point per vertex.

Question 3 Center away from the origin (2 points)

For M : vector $(3, 1)$, doubled $(6, 2)$, so $M' = (1 + 6, 2 + 2) = (7, 4)$.

For N : vector $(-2, -2)$, doubled $(-4, -4)$, so $N' = (1 - 4, 2 - 4) = (-3, -2)$.

$M'(7, 4)$, $N'(-3, -2)$

Scoring: 1 point per image.

Question 4 Properties of dilations (3 points)

- a. The image is a line parallel to ℓ .
- b. The image is m itself.
- c. $9 \times 3 = 27$ units.

(a) parallel line, (b) the same line, (c) 27 units

Scoring: 1 point per part.

Question 5 Similar triangle sides (3 points)

- a. $k = DE \div AB = 20 \div 8 = 2.5$.
- b. $EF = 2.5 \times 12 = 30$.
- c. $DF = 2.5 \times 10 = 25$.

(a) 2.5, (b) 30, (c) 25

Scoring: 1 point per part.

Question 6 AA similarity (3 points)

- a. $m\angle R = 180^\circ - 48^\circ - 75^\circ = 57^\circ$ and $m\angle Z = 180^\circ - 57^\circ - 75^\circ = 48^\circ$.
- b. Both triangles have angles 48° , 57° and 75° , so they are similar by AA.
- c. Match equal angles: $P (48^\circ) \leftrightarrow Z$, $Q (75^\circ) \leftrightarrow Y$, $R (57^\circ) \leftrightarrow X$.

(a) 57° and 48° , (b) similar by AA, (c) $\triangle PQR \sim \triangle ZYX$

Scoring: 1 point per part.

Question 7 Dilation then translation (2 points)

$AB = 3$ and $A'B' = 6$, so $k = 2$. The dilation sends A, B, C to $(0, 0)$, $(6, 0)$, $(0, 8)$. The translation by $(-2, 1)$ gives $(-2, 1)$, $(4, 1)$, $(-2, 9)$.

$k = 2$; translation by $(-2, 1)$

Scoring: 1 point per part.

Question 8 Flagpole shadow (2 points)

The triangles are similar by AA, so height $\div$ shadow is the same: $1.5 \div 1.2 = h \div 9.6$. Then $h = 9.6 \times 1.5 \div 1.2 = 12$.

The flagpole is 12 meters tall

Scoring: 1 point for the ratio, 1 point for the height.